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Kevin P. Weldon

Date: February 26, 2004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In Re Application of:)	
DOUGLAS E. BISE et al.)	Group Art Unit 3672
Serial No. 09/888,464)	Examiner:
Filed: June 25, 2001)	Jennifer Hawkins Gay
For: MONOLITHIC ROOF BIT)	Confirmation No. 8703
CUTTING BIT INSERT)	February 26, 2004

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APPEAL BRIEF

GROUP 3600

(1) Real Party in Interest

The rights to the above-identified patent application have been assigned by the inventors to Kennametal Inc., having its principal place of business located at 1600 Technology Way, P.O. Box 231, Latrobe, PA 15650-0231.

(2) Related Appeals and Interferences

There are no related appeals or interferences to the application identified above.

(3) Status of Claims

Claims 1-17, 19-21, 23, 25-35 and 37-39 are pending in the application.
Claims 1-3, 6-8, 14, 15, 19-21, 23, 25-28, 30-35 and 37-39 are rejected.
Claims 4, 5, 9-13, 16, 17 and 29 are objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form to include all of the limitations of the base claim and any intervening claims.

(4) Status of Amendments

A Final Rejection was mailed January 9, 2004. No amendments have been filed by applicants subsequent to the Final Rejection.

(5) Summary of Invention

The invention is an improved design for a drill bit body for a penetrating rotary drill bit. The drill bit body has a hard member at the axial forward end thereof. The hard member is an insert which is monolithic. The monolithic insert has at least three leading cutting edges. The three cutting edges project from a forward surface of the hard member. Each cutting edge is not straight but has an irregular nonlinear shape. In one embodiment, the cutting edge is stepped. A rearward end of the roof drill body is attached to the hard member. The rearward end comprises a central bore having a peripheral surface with a trio of debris apertures. It is believed that the stepped cutting edge provides for better disintegration of earth strata into smaller sized particles.

(6) Issues

Whether claims 1-3, 6-8, 14, 15, 19-21, 23, 25-28, 30-35 and 37-39 are unpatentable over Weaver et al. (US 2,894,726) in view of Galis (US 3,613,807) under 35 USC 103 (a).

(7) Grouping of Claims

Claims 1-3, 6-8, 14, 19-21, 23, 25-28, 30, 32-35, and 37-39 are grouped together in terms of their patentability over the outstanding rejection under 35 USC 103 (a) by Weaver in view of Galis.

Claims 15 and 31 are grouped together in terms of their patentability over the outstanding rejection under 35 USC 103 (a) by Weaver in view of Galis.

(8) Argument

Claims 1-3, 6-8, 14, 15, 19-21, 23, 25-28, 30-35 and 37-39 stand rejected under 35 U.S.C. 10(a) as being obvious over Weaver et al. (US 2,894,726) in view of Galis (US 3,613,807). It is respectfully submitted that the rejection of these claims under 35 USC 103 is improper and should be withdrawn.

The Examiner, in the body of the rejection, admits that Weaver does not disclose the insert as being monolithic. In each of the present independent claims 1, 19, 23, 32 and 37, the rotary roof bit is recited as being monolithic. The Examiner first admits that Weaver does not disclose a roof bit insert that is monolithic, but avers that in view of Galis' teaching it would have been obvious to construct the roof bit head insert in Weaver ("18") as an integral monolithic insert.

The cutting edges in Weaver et al. are formed by a plurality of separate inserts 24 made from tungsten carbide as described in column 3, lines 3-15. The inserts 24 are received in recesses forged in the blade 14. The inserts 24 are secured to the blade 14 either by a shim or soldering material, column 7, lines 25-47. The blade portion 14 in Weaver et al., forged as one piece, does not form the cutting edges of the bit. The three cutting edges are formed by a plurality of separate inserts 24.

The plurality of inserts themselves in Weaver et al. are disclosed in Weaver et al. as, preferably, being nonuniform in composition. In the preferred embodiment the outer corners of the inserts contain harder particles than the remaining portion of the inserts. The harder particles reduce the otherwise greater wear that would occur at the outer corner of the insert during operation. Weaver et al. discloses impregnating the corners of the inserts with diamond-like particles, see column 7, lines 5-25. This impregnation design results in the wear pattern shown in figures 17-19 of Weaver. It is averred in Weaver that this wear pattern is superior to a uniform wear pattern across the horizontal cutting edge. As indicated in column 7, lines 9-11, of Weaver et al., "When the drilling load is imposed upon the bit with a substantial width of horizontal face, more fracturing will occur." The purpose of impregnating the corners of the cutting edge of Weaver et al. with hard materials is to prevent catastrophic failure that otherwise would occur in a monolithic bit having a uniform composition. As commonly defined, a monolith, in *the Random House Dictionary*, is defined as having total uniformity.

The Examiner incorporates the Galis reference as teaching construction bits as a monolithic hard insert that resists damage at substantial cutting forces. The Examiner points to "(... col. 3, lines 1-5) as evidence supporting her conclusion that Galis teaches constructing a bit to be monolithic to improve such damage resistance when stressed by substantial cutting forces. Presumably, the Examiner believes that, since the drill in Galis was intentionally designed to have structure that would cause it

to last longer under greater forces, then presumably the insert head in Galis is designed to last longer under greater forces. It is admitted by applicant that the purpose of the design in Galis is to strengthen roof bit drill heads so they would not fail during operation at increased drill speeds and percussive forces. Galis prevents these failures by designing a drill rod that includes a solid core member and a concentric tubular outer member having holes therein to remove dust (see column 1, lines 38-43). The entire emphasis of the specification and claims, including the Summary of the Invention, is on the drill rod having a solid core member with a surrounding concentric tube for transmitting dust. Each of figures 3-6 illustrates other configurations of the solid inner core. The overriding purpose of Galis is to reduce the problems of drill rod flare and increase the amount of rotary torque that can be applied to the drill rod, see column 1, lines 48-54. The focus in Galis is on these prior art drill rod failures and shortcomings. The only details of the drill head insert 29 in Galis are described in column 2, lines 12-25, and relate to the shape of the drill head shank 28 and its cooperation with the drill rod. It is submitted that an artisan might be motivated to modify Weaver et al. to have a solid core with a concentric pipe for conveying dust to strengthen the earth-boring drag blade, but there is no motivation that can be taken from Galis to construct the drill head ("18") in Weaver et al. to be monolithic not explicitly or implicitly. The monolithic construction of the insert appears to be incidental to the primary purpose of Galis' invention.

The design and construction of the cutting edges and forward portion of Galis' drill head bit are not provided. Reference is made to the type of materials that are used to construct the drill rod in column 3, lines 40-58, but not the material used for the drill head 29 in Galis. As discussed immediately above, there is no disclosure in Galis regarding what the drill head insert 29 is constructed from. It is unclear, for instance, if it is made from a hard material such as carbide (see Weaver et al., column 3, line 9). The Examiner is speculating as to the composition of the drill head material in Galis. There is no motivation to construct the drill head insert in Weaver et al. to be constructed as monolithic tungsten carbide, steel or any other specific material. Galis does not disclose any preference for the drill head insert material or details of the composition employed to construct the drill head ("18"). There is no disclosure of tungsten carbide (or any other hard material) used for the drill head insert in Galis.

The Examiner, at best, would be speculating with regard to what material is used to make the drill head in Galis.

The Examiner remarks, on page 5 of the Final Rejection, that “the drilling head of Galis is constructed to increase bit life thus it would not have been formed from a “softer” material”. The apparatus in the Weaver patent is an earth-boring drag blade bit and Galis discloses a mining roof bit with a geometrically different shape. What may be considered hard material for roof bit applications is possibly considered soft material for earth-boring drag blade bits. There is no disclosure in Galis regarding the forces and torques that the roof bit is subjected to during operation

The Galis patent does not even disclose the necessary material composition that would imply or infer to an ordinary artisan that, by constructing Weaver et al.’s drill head bit as a monolithic hard material drill head bit from any such material composition, would allow for the drill bit to be used in situations where “a substantial cutting force [may be applied] to the bit without damaging the insert” as set forth in the Examiner’s rejection. The torsional and percussive forces that the drill cutting edges in Galis are subjected to are not disclosed therein. The Examiner appears to be making an assumption, without support from the references themselves, that the torsional and percussive forces Weaver et al. was designed to be subjected to are not as great as those percussive and torsional forces that the drill Galis was designed to withstand. For a proper rejection under 35 USC 103, the Examiner must find proper motivation in the references themselves. The forces that the Galis drill was designed to endure might as well have been less than the forces the Weaver et al. patent was designed to encounter.

Galis does not disclose a monolithic drill head insert made from tungsten carbide, explicitly or implicitly, nor does it explicitly disclose any motivation, such as advantages over prior art, in making a drill head insert monolithic. Nor can any motivation be implied as the respective percussive forces that Weaver et al. and Galis were designed to endure are not disclosed. Further, Weaver et al. discloses a preference for a cutting edge that is not monolithic, but includes a composition having elements dispersed in a nonuniform fashion therein. It is respectfully submitted that the Examiner is fabricating motivation to combine Weaver et al. and Galis, and that

neither imply nor explicitly provide motivation for combining the references as set forth by the Examiner.

It should also be noted that the Weaver et al. patent and the Galis patent are nonanalogous art. Weaver et al. is an earth boring drag bit and Galis is a roof bit system for drilling holes in the ceiling of mines so that a support can be inserted therein. The Examiner has not demonstrated that the prior art discloses adequate motivation, as required under 35 USC 103, to establish a *prime facie* case of obviousness. The Examiner is employing impermissible hindsight and the present application as a guideline in constructing the claimed invention.

In view of the above amendments and comments, it is believed that independent claims 1, 19, 23, 32 and 37 are patentable over the above 35 USC 103 rejection, and that all the dependent claims thereon, claims 2, 3, 6-8, 14, 15, 20-21, 25-28, 30, 31, 33-35 and 38-39 are likewise allowable over the above rejection.

With respect to claims 15 and 31, both claims recite the upper rake surface being oriented at an angle with the vertical that is different from the angle that the lower rake surface makes with respect to vertical. The Examiner, in the body of her Final Rejection, page 3, refers the applicant to "(see Figure 28)". Upon inspection of figure 28, the applicants do not recognize the limitations of claims 15 and 31 being illustrated therein. A profile view of the Weaver insert is not illustrated in the patent. The top view, Figs. 2, 4, 13, 12, 9, 16, 19, 21 and 18 illustrate that both the upper and lower rake surfaces are vertical and not at angle with respect to the vertical. Perhaps the Examiner is making reference to the upper steps' cutting edge, at 42 in Figure 28, cutting edge 42 makes an angle with regard to the vertical and the lower step cutting edges are horizontal.

The Examiner has failed to establish a proper *prime facie* case of obviousness under 35 USC 103. In view of the above arguments, it is believed that claims 1-3, 6-8, 14, 15, 19-21, 23, 25-28, 30-35 and 37-39 are allowable over Weaver et al. in view of Galis.

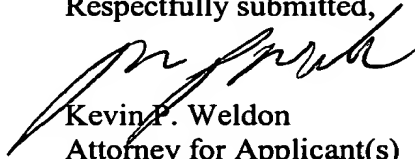
In view of the above amendments and comments, it is believed that claims 1-17, 19-21, 23, 25-35 and 37-39 are patentable over the art of record. Claims 4, 5, 9-13, 16, 17 and 29 have already been indicated as being allowable over the art of record. Thus, applicants respectfully request a Notice of Allowance indicating claims 1-17, 19-21, 23, 25-35 and 37-39 as being allowable. If for any reason the Examiner

Appl. No. 09/888,464
Appeal Brief dated February 26, 2004
Reply to Office Action of January 9, 2004
Attorney Docket K-1816

does not believe that the application is in condition for allowance, the Examiner is requested to telephone applicants with any comments or questions (724-539-3848) in order to expedite prosecution of the application.

The Commissioner is hereby authorized to charge any fees, including additional filing fees required under 37 CFR 1.16 and 1.17, in connection with this submission to Kennametal Inc. corporate Deposit Account 502832.

Respectfully submitted,



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K1816\appealbrief

(9) Appendix

LISTING OF CLAIMS:

1. (Original) A rotary drill bit for penetrating earth strata, the drill bit comprising: an elongate bit body having an axial forward end; and a monolithic hard insert being affixed to the bit body at the axial forward end thereof, and the hard insert presenting at least three discrete leading cutting edges for cutting the earth strata wherein each said at least three cutting edges is stepped.
2. (Original) The rotary drill bit of claim 1 wherein said at least three stepped cutting edges has an upper step and a lower step.
3. (Original) The rotary drill bit of claim 2 wherein each leading cutting edge of the upper step and each leading cutting edge of the lower step are parallel.
4. (Original) The rotary drill bit of claim 2 wherein both said leading cutting edge of the lower step and said leading cutting edge of the upper step are oriented at an angle of about 20 degrees with respect to the horizontal.
5. (Previously Amended) The rotary drill bit of claim 2 wherein a cutting edge transition portion is positioned between the lower step cutting edge and the upper step cutting edge the transition portion rises a vertical height of generally between 1/16-1/8 inches.
6. (Original) The rotary drill bit of claim 1 wherein the rotary drill bit has a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata

begins at a point radially outward of the central axis of the hard insert and extends in a direction away from the central axis.

7. (Original) The rotary drill bit of claim 1 wherein said at least three leading cutting edges for cutting the earth strata being formed by a corresponding leading surface of the hard insert intersecting a corresponding top surface of the hard insert.

8. (Previously Amended) The rotary drill bit of claim 6 wherein each of the stepped cutting edges has a radially inward upper step and a radially outward lower step.

9. (Original) The rotary drill bit of claim 8 wherein each of said upper steps have a length of generally between 1/8-1/4 inches.

10. (Original) The rotary drill bit of claim 1 wherein each one of said leading cutting edges has a leading surface being disposed at a rake angle of between about zero degrees and about negative fifteen degrees.

11. (Original) The rotary drill bit of claim 2 wherein each one of said cutting edges has a lower leading surface adjacent the lower step cutting edge being disposed at a rake angle of between about zero degrees and about negative fifteen degrees.

12. (Original) The rotary drill bit of claim 11 wherein each one of said upper steps has an upper leading surface adjacent the upper step cutting edge the upper step cutting edge being disposed at a rake angle of between about negative five degrees and about negative fifteen degrees.

13. (Original) The rotary drill bit of claim 2 wherein the upper step cutting edge has a top surface relief angle of about 30 degrees and the lower step has a top surface relief angle of about 21 degrees.

14. (Original) The rotary drill bit of claim 2 wherein the lower step has a generally planar lower rake surface and the upper step has a second generally planar upper rake surface.

15. (Original) The rotary drill bit of claim 14 wherein the lower rake surface is oriented at an angle with the vertical different from an angle which said upper rake surface makes with the vertical.

16. (Original) The rotary drill bit of claim 15 wherein the lower rake surface angle is between zero and negative ten degrees and the upper rake surface angle is zero and fifteen degrees.

17. (Original) The rotary drill bit of claim 16 wherein said lower rake angle is zero degrees and the upper rake angle is negative five degrees.

18. (Cancelled)

19. (Previously Amended) A rotary drill bit for penetrating earth strata, the drill bit comprising: an elongate bit body having an axial forward end; and a monolithic hard insert being affixed to the bit body at the axial forward end thereof, and the hard insert having at least three discrete leading cutting edges for cutting the earth strata wherein each said at least three leading cutting edges are nonlinear.

20. (Original) The rotary drill bit of claim 19 wherein the hard insert has a generally planar lower rake surface and a second generally planar upper rake surface.

21. (Original) The rotary drill bit of claim 19 wherein the rotary drill bit has a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata begins at a point radially outward of the central axis of the hard insert and extends in a direction away from the central axis.

22. (cancelled).

23. (Previously Amended) A monolithic hard member for attachment to a drill bit body so as to form a rotary drill bit for penetrating the earth strata and the rotary drill bit having a central longitudinal axis, the monolithic hard member comprising: at least three discrete leading cutting edges for cutting the earth strata, projecting from the forward surface of the hard member wherein each said at least three cutting edges, is stepped whereby the step improves the disintegration of the earth strata.

24. (cancelled).

25. (Previously Amended) The hard member of claim 23 wherein the hard insert further including a side clearance cutting edge for cutting the earth strata corresponding to each one of the leading cutting edges for cutting the earth strata.

26. (Previously Amended) The rotary drill bit of claim 23 wherein said at least three stepped cutting edges has an upper step and a lower step.

27. (Original) The rotary drill bit of claim 26 wherein each leading cutting edge of the upper step and each leading cutting edge of the lower step are parallel.

28. (Original) The rotary drill bit of claim 23 wherein the rotary drill bit having a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata begins at a point radially outward of the central axis of the hard insert and extends in a direction away from the central axis.

29. (Original) The rotary drill bit of claim 26 wherein each one of said upper steps has an upper leading surface adjacent the upper step cutting edge the upper step cutting edge being disposed at a rake angle of between about zero degrees and about fifteen degrees.

30. (Original) The rotary drill bit of claim 29 wherein the lower step has a generally planar lower rake surface and the upper step has a second generally planar upper rake surface.

31. (Original) The rotary drill bit of claim 30 wherein the lower rake surface is oriented at an angle with the vertical different from an angle which said upper rake surface makes with the vertical.

32. (Previously Amended) A monolithic hard member for attachment to a drill bit body so as to form a rotary drill bit for penetrating the earth strata said hard member comprising: at least three discrete leading cutting edges for cutting the earth strata wherein each said at least three leading cutting edges are nonlinear.

33. (Original) The hard member according to claim 32 wherein the leading cutting edge has an upper step and a lower step.

34. (Original) The hard member according to claim 33 wherein the lower step has a generally planar lower rake surface and the upper step has a second generally planar upper rake surface.

35. (Original) The hard member of claim 32 wherein the rotary drill bit has a central longitudinal axis passing through the hard insert, the bit body having a peripheral surface, and each one of the leading cutting edges for cutting the earth strata begins at a point radially outward of the central axis of the hard insert and extends in a direction away from the central axis.

36. (Cancelled).

37. (Previously Added) A mining roof bit having a monolithic hard member comprising: at least three discrete leading cutting edges for cutting the earth strata wherein each said at least three leading cutting edges are nonlinear.

38. (Previously Added) The mining roof bit of claim 37 wherein each of the leading cutting edges has a radially inward upper step and a radially outward lower step.

39. (Previously Added) The mining roof bit of claim 37 wherein each of the leading cutting edges essentially consists of a radially inward upper step and a radially outward lower step with a transition portion between said upper step and said lower step.